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Zhodnocení výkonnosti akcií high-tech společností v Číně
Stock Performance Evaluation of High-Tech Companies in China

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1 Introduction

With the rapid growth of global economy, as the largest developing country in the world, China's medium and low-end industries have become mature. As the same time, high tech stocks play an increasingly important role in China's stock market. and high-tech industries are at the top of the economic field, which has a huge driving effect on the economy. The high-tech industry is the core competitiveness of a country. Developing the high-tech industry can greatly improve the labour productivity and reduce the consumption of resources. Improve the competitiveness of enterprises and enhance the comprehensive national strength.

The aim of this thesis is to evaluate the performance of five high-tech enterprises on the basis of 2014-2019. For the purposes of this work, there are five representative companies selected from China’s high-tech industry. Their performance will be evaluated and compared based on stock historical returns, volatility and selected market indicators such as P/E ratio and payout ratio. We can analyse the situation and condition of China's high-tech industry based on the results, which may help investors make better choice.

There are five parts in this thesis, first part and last part is introduction and conclusion.

The second chapter is focused on principle of investing in capital markets, including role of financial markets, definition of primary market, secondary market, characteristic of stocks and bonds, then we will describe the methodology that is used in practical part.

The third chapter will introduce the overview of China’s stock market including its development process, defects, and regulatory system.

The fourth chapter uses the theory of the second chapter to estimate the return, risk and development trend of listed companies in China by calculating the holding period return, standard deviation, price-to-earnings ratio and dividend payout ratio of the selected high-tech companies.

The final chapter is the conclusion, which is a summary of the main findings and conclusions implied in this paper.

2 Principles of Investing in Financial Market

This chapter will show the role of the stock market in financial markets, focusing on the main functions of capital markets and principles of investing. And describe methodology that is used in practical part.

2.1 The Role of Financial Market

Financial market is marketplace where buyers and sellers participate in the trade of assets such as equities, bonds, currencies and derivatives. Financial market plays a decisive role in the allocation and operation of resources in modern economy. The products created by the financial market provide returns for those who have additional funds (investors) so that those funds can be used by those who need them (borrowers). They provide a market to bridge the gap between borrowers and lenders. Financial market is also the factor market of capital in economy. Enterprises need capital as input in the production process in order to produce goods and services that meet economic needs. Financial markets provide a very effective process through which aggregate demand can be stimulated even if income is not used for consumption. Savings from governments and customers can be used not only for future consumption, but also for capital investment. This process will increase economic production capacity. The main financial markets that operate in an economy are the stock market, the debt market, the derivatives market and the foreign exchange market (Mbalib, 2019).

2.1.1 Primary and Secondary Market

The primary market is where securities are created, primary market issues new security on an exchange for companies, governments, and other groups to obtain financing through debt-based or equity-based securities. Once the initial sale is complete, further trading is conducted on the secondary market, where the bulk of exchange trading occurs each day (Mbalib, 2019).

The secondary market is where investors buy and sell securities they already own. It is what most people typically think of as the "stock market," though stocks are also sold on the primary market when they are first issued. The national exchanges, such as the New York Stock Exchange (NYSE), is secondary markets (Mbalib, 2019).

2.1.2 Bond Market

The bond market is a financial market where participants can issue new debt, known as the primary market, or buy and sell debt securities, known as the secondary market. This is usually in the form of bonds, but it may also include notes, bills.

The bond market is an indispensable part of a country's financial system. A unified and mature bond market can provide low-risk investment and financing tools for investors and financiers.

The bond market plays an important role in the socio-economy because it has the following important functions:

(a) Financing function

As an important part of the financial market, bond market has the function of making funds flow from the surplus to the demanders and raising funds for the underfunded.

(b) Fund flow-oriented function

Bonds issued by companies with good returns are generally more popular with investors, so they have lower interest rates and lower financing costs when they are issued. On the contrary, bonds issued by companies with poor returns are relatively riskier and are less popular with investors. Therefore, through the bond market, funds can be concentrated to advantageous enterprises, which is conducive to the optimal allocation of resources.

(c) Macro-control functions

As the formulation and implementation department of a country's monetary policy, a country's central bank mainly relies on policy tools such as deposit reserves, open market operations, rediscounts, and interest rates for macroeconomic regulation and control. Among them, the open market business is that the central bank regulates the money supply by buying and selling securities such as government bonds on the securities market. An important means to achieve macro-control. When the economy is overheating and needs to reduce the money supply, the central bank sells bonds and recovers some of the currency held by financial institutions or the public to suppress the overheating of the economy. When the economy is depressed and the money supply needs to be increased, the central bank buys bonds (Mbalib, 2019).

2.1.3 Stock Market

The main component of the stock market is the stock, anybody can invest in the stock market. By picking up the phone or turning on the computer, you can own a piece of a company without ever attending meeting, developing a product, or devising a marketing strategy. Stock is the ownership of a corporation represented by stocks that are a claim on the corporation’s earnings and assets. A stockholder owns a percentage interest in a firm, so stock markets are markets in which stocks are issued and traded. The stock market is one of the main ways to raise funds for listed companies. With the development of commodity economy, the company's scale is growing, requires a lot of long-term capital. If only relying on the company's own capital accumulation, it is difficult to meet the needs of the development of production, it must raise funds from the outside. Companies to raise long-term capital generally have three ways: First, to the bank loans; second, the issuance of corporate bonds; third, the issue of shares. The first two ways have higher interest rates and time constraints, which not only increase the company's operating costs, but also make the company's capital difficult to stabilize, and thus have great limitations. And the use of the way to raise funds to raise funds, you do not have to pay the principal and interest, only part of the profits allocated to pay dividends can be. The secondary markets for corporate stocks are the most closely watched and reported of all financial security markets. This is because stock markets movements are seen as predictors of economic activity (Kelly, 2012).

The stock market has those important functions:

- Economic barometer:

Stock exchange can effectively measure the economic situation of a country. The stock price can reflect every major change of the country and economy. The rise or fall of the stock price indicates the boom or recession cycle of the economy. Stock exchanges are also known as economic mirrors that reflect the economic situation of a country.

- Pricing of securities:

The stock market helps to value the securities based on demand and supply factors. The securities of profitable and growth-oriented companies are valued higher as there is more demand for such securities. The valuation of securities is useful for investors, government. The investors can know the value of their investment, the creditors can value the creditworthiness and government can impose taxes on value of securities.

- Safety of transactions:

Only the shares of listed companies can be traded in the stock market, and stock exchange authorities include the company's names in the trade list only after verifying the soundness of company. The companies which are listed they also have to operate within the strict rules and regulations. This ensures safety of dealing through stock exchange.

- Contributes to economic growth:

In stock exchange securities of various companies are bought and sold. This process of disinvestment and reinvestment helps to invest in most productive investment proposal and this leads to capital formation and economic growth.

- Better allocation of capital:

The shares of profit-making companies are quoted at higher prices and are actively traded so such companies can easily raise fresh capital from stock market. The general public hesitates to invest in securities of loss-making companies. So, stock exchange facilitates allocation of investor's fund to profitable channels (Cecchetti, 2011).

2.2 Features of Stocks

Stock market, equity market or share market is the aggregation of buyers and sellers (a decentralized network of economic transactions, not a physical facility or entity) of stocks (also called shares), which represent ownership claims on businesses; these may include securities listed on a public stock exchange, as well as stock that is only traded privately. Examples of the latter include shares of private companies which are sold to investors through equity crowdfunding platforms. Stock exchanges list shares of common equity as well as other security types, e.g. corporate bonds and convertible bonds.

2.2.1 Main Characteristics of Stocks

- Non reparability

Stock is a security that has no repayment period. After an investor subscribes for a stock, he can no longer ask for a withdrawal, but can only sell it to a third party in the secondary market. The transfer of shares only means the change of shareholders of the company and does not reduce the capital of the company. As far as the term is concerned, as long as the company exists, the shares it issues will exist. The term of the shares is equal to the term of the company's existence.

- Participation:

Shareholders have the right to attend the general meeting of shareholders, elect the board of directors of the company and participate in major decisions of the company. The right of shareholders to participate in the decision-making depends on the number of shares they hold. In practice, as long as the number of shares held by shareholders reaches the actual majority required by the decision-making results, they can control the decision-making of the company

- Profitability

The shareholders have the right to receive dividends or bonuses from the company and obtain the income from the investment by virtue of the shares they hold. The size of dividend or bonus mainly depends on the company's profit level and the company's profit distribution policy (Jinglian Wu, 2004).

2.2.2 Types of Stocks

There are many types of stocks, which can be described in many ways, so these shares have different names, forms and rights. There are also various categories of stocks. According to the classification of shareholders' equity, stocks can be divided into common stocks, preferred stocks and stocks after allotment. This mainly depends on whether the shareholders have the right to vote. The common shares have the right to vote, while those preferred shares are usually limited, and non-voting shareholders cannot participate in the company's decision-making. According to the listing area, the shares of listed companies in China may be different, which are divided into A-share, B-share, H-share, n-share and s-share. The difference is based on where the shares are listed.

- Common stocks and preferred stocks

This is mainly based on the size of the rights represented by the stock, both of preferred stock and common stock represent ownership in a company. Preferred stock has a set dividend that does not fluctuate based on how well the company is performing. Preferred stockholders receive their dividends before common stockholders. Finally, preferred stockholders are paid first if the company fails and is liquidated. Common stock entitles you to voting rights and any dividends that the company decides to pay. The dividends will fluctuate with the company’s success or failure (Ziemba, 2018).

- Registered stocks and bearer stocks

This is mainly based on whether the stock records the name of the shareholder. In the case of a registered stock, the name of the shareholder is recorded on the stock. If the transfer is necessary, the company must go through the transfer formalities. A bearer share is an equity security wholly owned by whoever holds the physical stock certificate, thus the name "bearer" share. The issuing firm neither registers the owner of the stock nor tracks transfers of ownership.

- par value stocks and no-par value stocks

This is mainly based on whether the stock is stated in the amount of each share. There is a par value of the stock, which is the amount of the stock per share. No-par value stocks, only the stock and company capital, or the ratio of each share to the company's total capital.

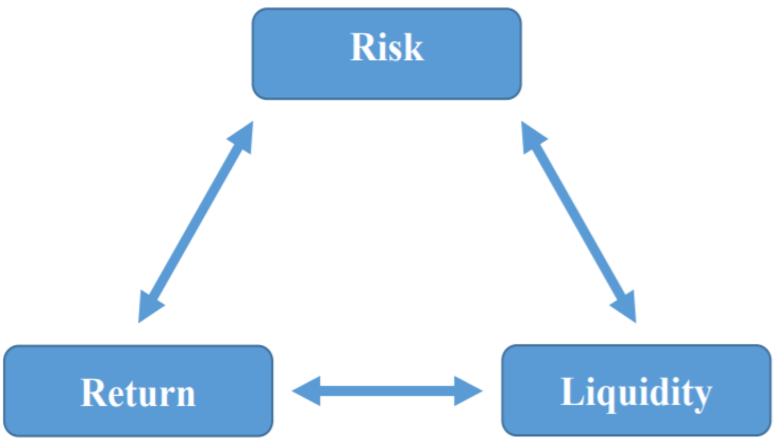
2.3 Main Principles of Investing

In finance, an investment is a monetary asset purchased with the idea that the asset will provide income in the future or will later be sold at a higher price for a profit.

2.3.1 Investment Triangle

As shown in Figure 2.1, the three elements of investment are the liquidity, profitability and safety. When making investment decisions, we must fully consider these three elements.

Figure 2.1 Investment Triangle



Source: Author

From Figure 2.1, we can see that three significant factors of investment, risk, return and liquidity are unified and interact with each other.

2.3.2 Liquidity

Stock liquidity refers to the tradability of stocks between different investors. Liquidity can be measured by these indicators: the number of shares, the number of shares that can be circulated, the sensitivity of the price of stocks to the volume of transactions, the volume of transactions will increase as the number of tradable shares increases, and the sensitivity of the price to the volume And the liquidity of the stock changes in the opposite direction, the lower the price's sensitivity to the trading volume, the better the stock's liquidity, and vice versa. The circulation of stocks allows investors to sell stocks and obtain cash. The liquidity of stocks is an important indicator for people to judge the profitability and development prospects of listed companies. In this thesis, the main influencing factors of liquidity are summarized as follows.

- Stock trading characteristics

The trading characteristics of stocks include the size and amount of each transaction. The more the total trading volume is, the higher the liquidity is. The low-price difference is usually accompanied by high trading volume, high trading volume and high volatility, which will lead to low transaction cost.

- Securities transaction cost

Transaction cost includes all factors affecting transaction execution, which can be divided into explicit transaction cost and implicit transaction cost (Donghui Shi, Peiyuan Sun, 2005). Explicit transaction cost includes commission and commission, while implicit transaction cost includes bid ask spread, market impact cost and opportunity cost. If the transaction cost of the market is high, the enthusiasm of investors to participate in the market transaction is low, which leads to the inactivity of market transaction and the decline of market liquidity.

- The degree of competition in the securities market

Under the condition that other factors remain unchanged, the effective competition degree of the market will play an important role in the liquidity of the market. The higher the effective competition degree, the higher the liquidity of the market (Yan Shaobing, 2015). The substitutability of securities assets in the market also affects the liquidity of securities.

The higher the substitutability of securities, the higher the liquidity. If there are two securities markets that operate the same securities products, trading activities will inevitably concentrate on the market with good liquidity.

2.3.3 Risk

There are various classifications and definitions of risk. This thesis mainly discusses investment risk. Investment risk refers to the uncertainty of future investment income. The investment may be the risk of loss of profit or even loss of principal. For example, investing in stocks may lose money or even lose principal, and bonds may not be repaid in a timely manner. There are various risk factors. First, they must be organized into two categories, systemic and non-systematic risks. There are usually two reasons why stock prices change. One is the individual stock price fluctuations caused by the internal and external factors of the stock itself, and the other is the stock price fluctuations that are related to the stock market changes. These two factors affect the stock price. Changes in the stock price due to the stock's own reasons can cause the stock price to rise or fall in a short period of time, but the long-term impact on the stock is small. What has a longer-term impact on stocks is the joint impact of the stock market on individual stocks. Under the state of market equilibrium, the return of a stock is the reflection of the size of the stock market risk it bears. This kind of risk can be called the stock system risk. This risk is the overall market behaviour that investors cannot control, and it will affect all stocks. It cannot be avoided by investors' diversified portfolios of securities, so it is also called non-diversity risk. The risk specific to the stock itself is called non-systematic risk, which refers to the possibility that certain unique events that occur in individual companies will cause losses to their stock returns. For example, if a company makes a mistake in its decision-making or its management is in place, it is different from systemic risk, and specifically refers to the risk unique to individual stocks and changing at any time. It mainly includes operating risk and financial risk. Because non-systematic risk only affects partial stock returns, it can be avoided by investors' diversified portfolios, so it is also known as diversified risk (Farrell, 2000).

Financial risk is an unavoidable problem in the operation of an enterprise. This type of risk exists objectively. The financial environment is complex and changing rapidly. Factors including economic environment, legal environment, market environment, social and cultural environment, and resource environment will affect financial risks. The above factors exist outside the company, but they have a significant impact on the company's financial management. Right financial decision-making can greatly reduce financial risks, which shows that a good market environment and good decision-makers can greatly reduce the possibility of risks. We can use a simple way to quantify risk using the formula (2.1). This method is to calculate standard deviation of returns, σ,

$$\sigma = \sqrt{\sigma^2}\ , \tag{2.1}$$

where σ^2 is variance and it is calculated as the weighted average of the square of the difference between historical rate of return (r_t) and average historical rate of return (r_A), and T is number of time periods (2.2).

$$\sigma^2 = \frac{\sum_{t=1}^{t}(r_t - r_A)^2}{T} \tag{2.2}$$

Standard deviation restores the original unit of measurement through the square root of the variance. The advantage of standard deviation over variance is that standard deviation is easier to compare, the larger the calculated variance and standard deviation, the greater the deviation between the actual yield and the expected yield, the greater the risk of investment in the securities; the smaller the calculated variance and standard deviation, the smaller the deviation between the actual yield and the expected yield, the less the risk of investment in the securities. Therefore, we can consider that variance or standard deviation is positively correlated with risk level.

2.3.4 Return

Return is the gain or loss of a security in a specific period. The total return consists of the income and the capital gain relative to the investment, usually expressed as a percentage. In this thesis we will introduce the holding period return (HPR).

Holding period return is an important index of investment efficiency. It refers to the yield obtained in the specific period from purchase to sale. Holding period return (HPR) can be calculated as follows:

$$r = \frac{P_1 - P_0}{P_0}\ \text{, or} \tag{2.3}$$

$$r = \frac{P_1}{P_0} - 1, \tag{2.4}$$

where P_1 is market value at the end of the interval, P_0 is market value at the begin of the interval. We can modify the formula (2.4) and express the annualized rate of return using the equation (2.5) ,

$$r_{p.a.} = \sqrt[n]{\frac{P_1}{P_0}} - 1 \tag{2.5}$$

where n is number of years of the investment.

For example, the purchasing price of a stock is 500, the selling price is 2000, holding period is 2 years. We use the formula (2.5) to calculate the annual holding period return,

$$r_{p.a.} = \sqrt[2]{\frac{2000}{500}} - 1 = 1.$$

Using this formula, we get the annual period return is 100%.

2.4 Calculation of Market Indicators

In this chapter, we will introduce two very important formulas in the analysis of market indicators, in order to analyse the development trend of selected stock companies at a certain stage.

Price-Earnings Ratio

The price of a stock divided by its earnings per share is called its price-earnings ratio. When calculating, the stock price usually takes the latest closing price. In terms of the price-earnings ratio, if the previous year's price-earnings ratio is calculated, it is called the historical price-earnings ratio. Broadly speaking, the price-earnings ratio usually refers to the static price-earnings ratio, which is usually used as an indicator to compare whether stocks with different prices are overvalued or undervalued. The price-earnings ratio of a company's stock is not always accurate. It is generally believed that if the price-earnings ratio of a company's stock is too high, then the price of that stock is frothy, and its value is overvalued. The lower the price-earnings ratio of a stock, the lower the profitability of the market price relative to the stock, indicating that the shorter the investment recovery period, the smaller the investment risk, and the greater the investment value of the stock; otherwise, the conclusion is the opposite (Kelly, 2012).

The P/E ratio can be calculated as follows,

$$\frac{P}{E}\ ratio = \frac{price\ of\ stock}{EPS}\ . \tag{2.6}$$

Payout Ratio

The payout ratio is the percentage of net income that a company pays out as dividends to common shareholders， it is an indicator of how well earnings support the dividend payment. High growth companies often have low payout ratios, they use the money to invest in other projects. The formula for calculating the payout ratio is as follows,

$$\text{Payout ratio} = \frac{divedend\ per\ share}{net\ income\ per\ share}\ . \tag{2.7}$$

3 Overview of Chinese Stock Market

From the middle and late 1980s to the outbreak of American subprime crisis in 2007, the world experienced a period called "great stability" by some economists. In particular, the period 2002-2007 is a highly optimistic "golden age" for world economic growth. Except for a few countries such as Japan, all kinds of economies, including the developed countries of the United States and Europe, emerging economies and developing countries, have achieved relatively high economic growth. At that time, China's rapid economic growth became a powerful engine of world economic growth, this trend of growth continues to this day

3.1 China's Economic Development in Last Decade

As one of the largest economic production countries in the world, China has the world's leading ranking of consumption and production, with a large population and vast territory. However, in the process of rapid development, China is aware of the environmental damage, resource waste and other problems caused by the excessive pursuit of economic development. The Chinese government is trying to change its development model. China's economy has shifted from a stage of high-speed growth to a stage of high-quality development.

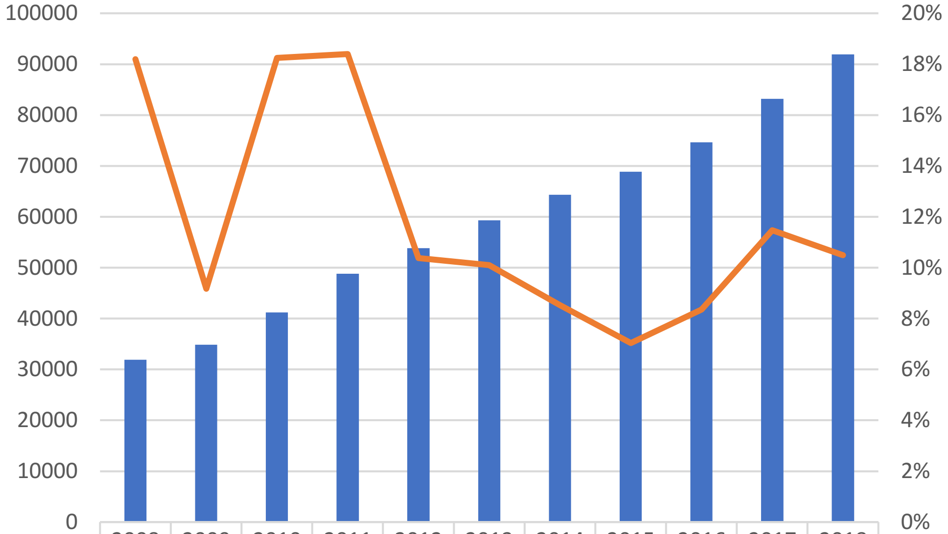
In this thesis, we use the following indicators to do some basic analysis of China's economic development in the past few years:

- Gross domestic product;
- gross national income and
- income index.

- Gross domestic product (GDP)

As the core index of national economic accounting, gross domestic product (GDP) plays an important role in reflecting economic development and serving macro decision-making. As the famous economist Samuelson (1999) pointed out, "the most important indicator of all concepts of macroeconomics is GDP. Without GDP as a general indicator of national economy, policy makers can only wander in a sea of disordered data. " It can be said that the history of a country's GDP changes, to a certain extent, represents the history of the country's economic development. Figures 3.1 and 3.2 show that China's economy has maintained a stable growth trend in the past decade. Due to the economic crisis in 2008, China's economic growth has slowed down temporarily. From 2009 to 2012, China's economic growth has always maintained a growth trend of more than 10%. Since 2012, China's economic growth has tended to be stable. Therefore, the income level and income growth of residents are relatively moderate, which shows that the Chinese government has changed its development mode, focusing on environmental protection and resource conservation.

Figure 3.1 2008-2018 China GDP and GDP growth rate (Billion RMB)



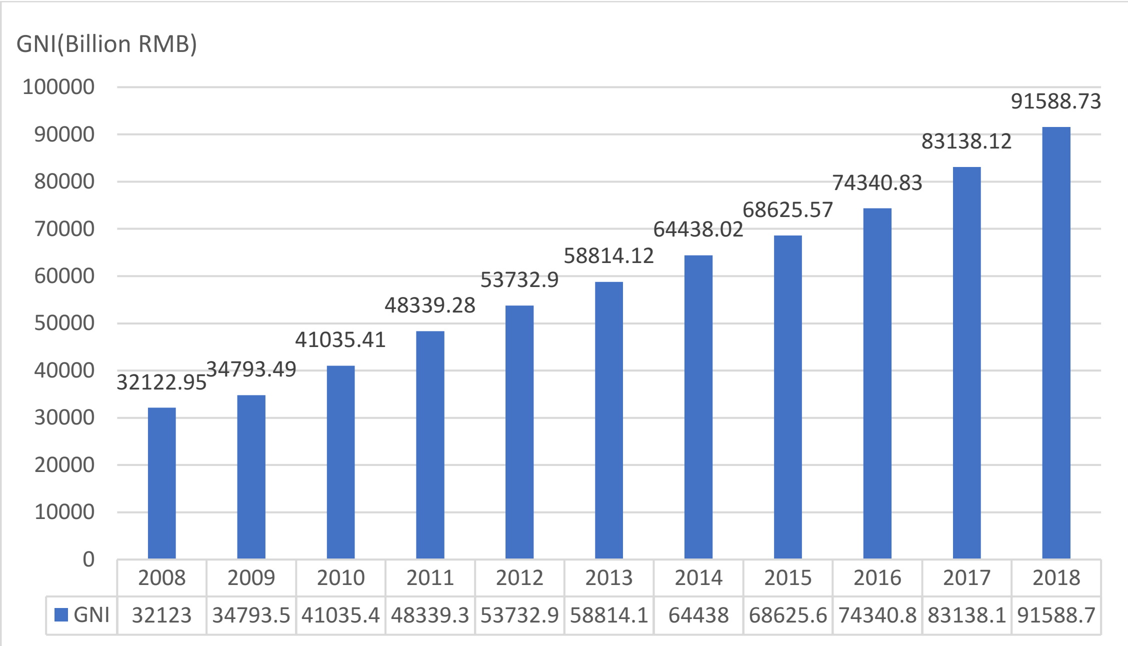
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GDP	31924	34852	41212	48794	53858	59296	64356	68886	74640	83204	91928
Growth rate	18%	9%	18%	18%	10%	10%	9%	7%	8%	11%	10%

Source: National Bureau of Statistics of China (2020); Author

- Gross national income (GNI)

Gross national income (GNI) is the total amount of money earned by a nation's people and businesses. It is used to measure and track a nation's wealth from year to year. The number includes the nation's gross domestic product plus the income it receives from overseas sources. GNI is an alternative to gross domestic product (GDP) as a means of measuring and tracking a nation's wealth and is considered a more accurate indicator for some nations.

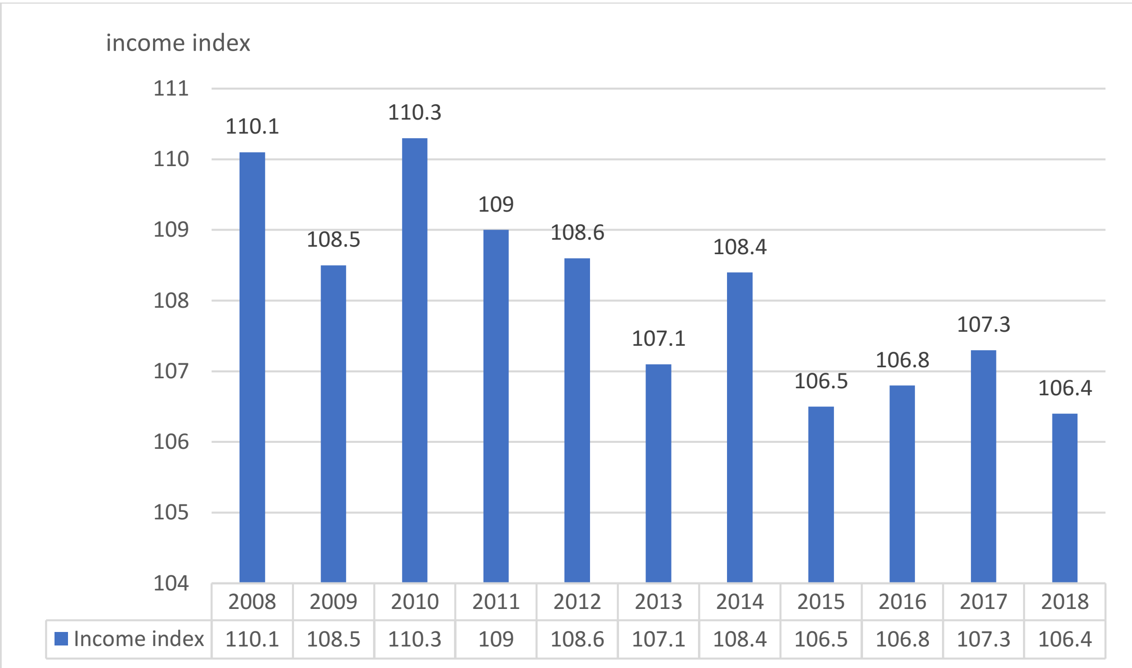
Figure 3.2   2008-2018 China GNI (Billion RMB)



Source: National Bureau of Statistics of China (2020); Author

- Income index

Figure 3.3   2008-2018 China Income Index



Source: National Bureau of Statistics of China (2020); Author

Figure 3.3 shows that due to the impact of the global financial crisis, China's economy has been affected. The income index dropped from 110.1 in 2008 to 108.5 in 2009, and fluctuated to about 107 after 2010, which also shows that China's economic growth continues to slow down.

3.2 Characteristics of Stock Market in China

The emergence of the stock market is an important milestone in the process of human economic and social modernization, and an important product of the in-depth development of commercialization, monetization, credit and securitization. At the same time, the stock market has greatly liberated and developed social productivity and promoted the rapid development of economic society. The stock market is of great significance to the modern market economy. China's stock market has only taken less than 30 years since its emergence and development. It has almost completed the development of the stock market in Western developed countries for more than 200 years, which is a brilliant development achievement. By the end of 2012, there were 2494 listed companies in Shanghai and Shenzhen, with a total share capital of 3839.5 billion shares, with a total market value of 23.03 trillion, equivalent to 44.33% of GDP in that year. In 2012, the IPO issued 29.9 billion shares and raised 413.438 billion yuan. The annual stock trading volume reached 3288.1 billion shares and the stock trading volume reached 31.47 trillion yuan, making it one of the most important markets in the world (Yifu Lin, 2018).

3.2.1 History of China Stock Market

Reviewing the development of China's stock market since the reform and opening up, it can be roughly divided into three stages.

- Initial stage (before 1998)

The formation of China's stock market was in the late 84's of last century. At that time, China's stock market was still in its infancy. There were few kinds of stocks traded in the market, the overall capacity of the stock market was very small, the securities laws and regulations were not perfect, the external environment required for the development and expansion of institutional investors was very incomplete, and the main investors in the market were mainly individual investors. In 1987, Shenzhen Special Economic Zone

Securities Company, the first specialized securities company in China, was born. Subsequently, with the support of local governments, securities companies were established in various provinces and cities. By the end of 1998, there were 337 securities companies in China, which were characterized by weak strength, large number and strong regional characteristics. At the same time, the securities company operates the self-supporting and agent financing business. It is not only the financial intermediary of the stock market, but also the main institutional investor at that time. In October 1991, Wuhan Securities Investment Fund and Shenzhen Nanshan venture capital fund were established. These two funds were the first batch of closed-end funds in China. In 1992, another 37 investment funds were issued. Among them, Zibo township enterprise fund was listed and traded in Shanghai Stock Exchange (SSE) in August 1993, which was the first listed and traded investment fund in China's stock market. At the end of 1997, there were 78 funds and 47 fund certificates in China. The total amount of funds raised was 7.6 billion yuan, which was insignificant compared with the market value of 1752.9 billion yuan in Shanghai and Shenzhen stock markets at that time. Due to the small scale of the fund, the single organizational form and the inability of investment institutions to carry out effective portfolio investment, the quality of investment fund assets is not high, and the level of investment returns is low.

- Development stage (1995-2004)

At this stage, the laws and regulations on the investment of institutional investors in China are constantly improved. In 1998, the State Council abolished the Securities Commission, and the securities regulatory functions were all assigned to the China Securities Regulatory Commission, which established a centralized and unified regulatory system for the securities industry. In December of the same year, the Standing Committee of the Ninth National People's Congress passed the securities law of the people's Republic of China, which provided a clear legal basis for the behaviours of the main bodies of the market. In October 1997, the Interim Measures for the administration of securities investment funds were promulgated, which regulated the establishment, raising and trading of securities investment funds and clarified the rights and obligations of fund managers, fund custodians and fund holders. At the same time, the market access conditions for institutional investors have been relaxed and the scale of institutional investors has been growing. In March 1998, Jintai and Kaiyuan securities investment funds were established, and standardized securities investment funds began to become the main direction of the development of China's fund industry. In 2001, Hua'an innovation investment fund, the first open fund in China, was established. In terms of access to other institutional investors, in September 1999, financial companies and other three types of enterprises were approved to invest in the secondary stock market. In October 1999, insurance funds were approved to access the market. In February 2001, social security funds were approved to access the market. The scale of institutional investors in China has been expanding.

- Growth stage (2004 to present)

In January 2004, the State Council issued "Several Opinions on Promoting the Reform and Opening-up of Capital Markets and Stable Development", further proposing to vigorously develop the capital market, explicitly proposing "encouraging compliance funds to enter the market, continuing to vigorously develop securities investment funds, and supporting insurance funds. Directly invest in the capital market in a variety of ways, gradually increase the proportion of funds invested in the capital market such as social security funds, enterprise supplementary pension funds, and commercial insurance funds, and cultivate a group of honest, law-abiding, and professional institutional investors. "Insurance-based institutional investors have become the dominant force in the capital market." Institutional investors in the Chinese stock market continue to grow. In October 2004, insurance funds were allowed to enter the stock market directly for trading, and in November, corporate annuities were allowed to enter the stock market for trading. The promulgated "Securities Law of the People's Republic of China" and the "Company Law of the People's Republic of China" promulgated in October 2005 and their formal implementation in January 2006 have made China's stock market laws and regulations more complete. These two laws have patched up the deficiencies in the previous security's regulatory laws, greatly enhanced the level of rule of law in China's stock market and helped increase investor confidence in the stock market (Zenghong Deng, 2013).

3.2.2 Characteristics of Investors in China's Stock Market

Investment is a kind of economic behaviour that pursues future currency appreciation, which contains two meanings. First of all, the purpose of investment is to make money gain value in the future and pursue the maximization of economic benefits. Secondly, investment is an economic behaviour, and the behaviour of investors is affected by their psychological factors. Investors' demand, motivation, risk preference, emotion, information processing ability and other factors have a significant impact on investment behaviour. Investment behaviour is not only a function of investment income, but also a function of investors' psychological behaviour (Xiaowu Dong, 2018). Generally speaking, investors' behaviour in China's stock market shows the following characteristics:

- Diversification of investors

At present, China's economy is dominated by state-owned economic components, and various economic forms coexist. The owners and operators of various economic components can be engaged in investment activities as the main investors, forming a diversified investment body of the state, Department, local, enterprise and individual. The diversification of investors makes the sources of capital diversified. The sources of investment capital in the stock market are also divided into individual, national, local and departmental, enterprise accumulation and specialized investment institutions. In the early stage of the development of the stock market, individuals are the majority of the investors. With the development of China's economy and the improvement of the stock market, the proportion of other sources of investment is increasing.

- Investment mode differentiation

According to the amount of capital, the investment behaviour of China's stock market can be divided into institutional investors and small and medium-sized retail investors. Large institutional investors, with abundant funds and information advantages, can manipulate the stock market to a certain extent. Their investment is initiative and scientific, and their returns in the stock market are relatively higher than those of small and medium-sized retail investors. Due to the lack of organization and planning, small and medium-sized retail investors tend to follow the trend of investment and follow the rise and fall of investment with irrational characteristics. According to age, investors of different ages have different behaviour characteristics in the stock market. Because young investors have just joined the work, their savings are limited, and their investment amount is relatively small. However, because they are in the period of rising income, they are able to bear higher investment risk, which makes their investment behaviour more adventurous. The old investors save more and invest more, but the old investors can bear less risk because of their great dependence on investment income. The old investors tend to be more conservative in their investment behaviour.

- Sensibility of investment decision

Because the stock investment is highly related to the investors' own interests, the investors are very sensitive to the price fluctuation of the stock market, and the investors are highly concerned about the investment income, which makes them highly dependent on the group and information. Investors often need to make decisions in the face of risks, which brings a variety of psychological pressure and emotional fluctuations. Irrational decision-making is usually accompanied by herd mentality and herding effect of stock market investment, especially the behaviour of individual investors in China's stock market. Psychological factors are one of the main factors that affect the behaviour of investors in China's stock market. Due to the limitations of their own knowledge and experience, investors often make mistakes in their cognition and then irrational investment behaviour occurs.

3.2.3 Current Situation of China Stock Market

Since the 2008 financial crisis, China has continuously strengthened the government's intervention in the stock market. During the global financial crisis in 2008, the Chinese government decided to invest 4 trillion yuan in the stock market, which greatly stimulated the stock market. The market value of China's stock doubled from 12136.64 billion yuan in 2008 to 2439.91 billion yuan in 2009, which has also left a hidden danger for China's future development. The harm of inflation and overcapacity is gradually exposed. China's stock market continues to be in a depressed state. From Table 3.1, we can find the total market value of China's stock in 2010 is 2654.23 billion yuan. In the next three years, the market value of the stock continues to decline until 2014, China's economic development has maintained a high speed and steady in recent years, but the development of the stock market has not recovered It has been in a downturn. The state of the stock market has worsened the confidence of investors. China tries to stimulate the stock market through policies (National Bureau of Statistics of China, 2020).

Table 3.1 The Stock Volume of China Stock Market

Year	Number of listed companies	Stock volume of transaction (in billion RMB)	Total stock market price (in billion RMB)
2008	1,625	26,711.27	12,136.64
2009	1,718	53,598.70	24,293.91
2010	2,063	54,563.36	26,542.26
2011	2,342	42,164.46	21,475.81
2012	2,494	31,458.33	23,035.76
2013	2,489	46,872.90	23,907.72
2014	2,613	74,238.53	37,254.70
2015	2827	255054.13	53146.27
2016	3052	127768.00	50768.59
2017	3485	112462.51	56708.61
2018	3584	90173.90	50580.69

Source: National Bureau of Statistics of China (2020); Author

3.3 Factors Affecting China's Stock Market

Stocks (listed companies, fundraisers), funds (investors), regulators, and intermediaries constitute the four main participants in the stock market. China's stock market has the common features of foreign stock markets and has Chinese characteristics. According to the trend of China's stock market in recent years, we can summarize the following points.

1. The influence of policies on the issuance of Chinese stocks, especially the listing and issuance of state-owned enterprises' stocks, is determined by policies. The Chinese government determines how much money can be used to purchase stocks every year. An important reason for the existence of the Chinese stock market is that through providing investors with investment places and raising funds for state-owned enterprises, the policies of the Chinese government will Market confidence has an impact. Every major turning point in China's stock market has national policies as its background.

2. The impact of price index. The stable rise of production price has a positive stimulus, which will increase the nominal return of stock investment and then increase investment. The interest rate of the bank remains unchanged. In order to maintain and increase the value and obtain the maximum benefit, the masses will cut deposits and invest in stocks. However, if prices rise too fast or too much and exceed the normal economic growth rate,

it will lead to inflation, lower real income and reduced market demand, and aggravate overproduction, which may lead to economic crisis and eventually make the stock price fall.

3. The impact of GDP, from Figure 3.1, we can find that China's GDP has maintained a sustained and rapid growth in recent years. The growth of GDP shows that China's economic development is very good. The company will increase investment, speed up financing, and expand the company's scale. At the same time, stock investors are more active in the market due to their optimistic attitude towards future income, increasing consumption and investment funds, affecting the demand curve of the stock market.

4. The impact of interest rates. According to the classical economic theory, interest rate is the price of capital, investment needs a lot of capital, while saving provides a lot of capital. Lower interest rates will reduce the cost of money, convert deposits for investment, cash flow and increase the discount rate of enterprises, and share prices will rise. On the other hand, if the interest rate is lowered, the stock market will have a good situation.

5. The impact of exchange rates. Exchange rate is the price comparison between local currency and foreign currency, and it is the expression of RMB price. Basically, there is a relationship between exchange rate and stock market: if the basic currency appreciates, then domestic and foreign investors will hold a large number of RMB, which will stimulate the stock market to rise, and a large number of funds will flow into China continuously, which will increase the upward pressure. Once the exchange rate rises, the stock market will be more affected. The appreciation of exchange rate will make capital flow in constantly. Many foreign funds will invest in the stock market, which is not only conducive to the expansion of capital market capacity, but also can make part of investment directly injected into various industries and continue to stimulate the rise of stocks (Xiaowu Dong, 2017).

3.4 The Defect of China Stock Market

In the past 30 years, the stock market has been playing a leading role in China's modern financial system, providing direct financing for China's economic growth. The relationship between the stock market and China's economic growth has been widely concerned in the process of China's economic development. However, in terms of the current situation of the stock market, the stock market is in a state of continuous decline, which is related to some problems existing in the development of the current stock market in China and the failure to point out and deal with them in a timely and effective manner.

- Weak Investment Ability and Excessive Speculation of Investors

China's stock market has been developing for less than 30 years since it came into being. It has almost completed the course of western developed stock market for 200 years. It has become one of the fastest growing stock markets in the world. At present, stock speculation has become a hot topic in society. With the great achievements of the development of China's stock market, the criticism of the characteristics of excessive speculation in China's stock market has never been interrupted. Among them, "excessive speculation" is the most common word in the criticism. Among the criticisms, China's stock market has improved and revised some regulations on cash dividends of listed companies and cultivated a large number of institutional investors. However, excessive speculation is still prevalent in China's stock market, and participants in the stock market often do not consider long-term value investment when making investment. From the perspective of investors, the investment behaviour of individual investors in China tends to be short-term investment, while institutional investors tend to make use of their own information and capital advantages to manipulate the stock market price for profit by creating hot spots, short term investment behaviour is common in the market. In order to win the price difference, gain profits and high turnover, there is excessive speculation. In the stock market, moderate speculation helps the market to find the real value of the stock, while excessive speculation will have a magnifying effect on the stock, resulting in the maximum fluctuation of the stock price and greater risk to the stock market. Therefore, speculators also bear greater risk, which hinders the normal operation of the stock market (JunChang Pan, 2015).

- Investor Take Higher Risk for Higher Returns

Many investors in the stock market are not satisfied with the current situation and want to pursue higher returns. As long as the stock exists, there are risks, because no one can accurately analyse the stock market. Behind the high return is the high risk. In many cases, because of the deviation of investors' self-knowledge and evaluation, they can't correctly evaluate their ability to bear the risk, can't clearly understand their investment motivation and capital strength, and lack the investment knowledge and experience of the stock market, so they venture into the stock market. Because of their low risk tolerance, they can't bear the risk of the stock market Volatility and impact, thus exiting the market, the income is not high, and may appear negative growth of income.

- The Main Purpose of Investing in the Stock Market is to Obtain Capital Gains

Different from western developed countries, the main purpose of individual investors in China's stock market is not to get dividends, but to get capital gains. Generally speaking, the stock dividend is less, but relatively stable, while the capital gains, although it is possible to obtain extra high returns, have great risks. The main purpose of individual investors in China is to obtain capital gains, which shows that there is a high degree of speculation for individual investors to enter the market. According to the survey, in 2011, 76.8% of the individual investors in China entered the market mainly for the purpose of obtaining capital gains through stock trading, and only 11.7% of the investors entered the market for the purpose of obtaining dividend distribution of the company. In 2014, investors' motivation became mainly to obtain more wealth growth. Considering the low dividend level of Listed Companies in China's stock market, the tendency of individual investors in China's stock market to enter the market mainly to obtain capital gains has not changed greatly (Zenghong Deng, 2014).

- Split Share Structure

Non-tradable shares and tradable shares are divided into two parts according to whether they can be listed and traded on the stock exchange. The separation of stock rights causes an unreasonable institutional arrangement of different prices, rights and interests of the same shares of the circulating and non-circulating shares. The structural contradictions and deep-seated disadvantages caused by such institutional arrangement are gradually exposed. The separation of stock rights makes the property right structure of the listed companies unclear, the pricing mechanism distorted, and the evaluation of the industrial value system chaotic. Pricing mechanism is the core mechanism of the stock market. The market mainly relies on the function of price to realize the reasonable flow of resources. Due to the unreasonable institutional arrangement in the stock market, the operation of the market mechanism is extremely distorted, and the price mechanism cannot play a role in the stock market, resulting in the majority of shares cannot be circulated, resulting in the small scale of the circulating shares of listed companies, strong speculation, large fluctuations in the stock price, and distorted pricing mechanism. The weakening of pricing function intensifies the speculation in the stock market, which leads to the instability of investors' expectation and the lack of confidence in the market, thus affecting the stability and healthy development of the whole national economy (Guohua, He).

- System Defects

At present, the defects of the stock market in China are as follows: due to the unreasonable industrial structure and regional structure, it is not conducive to play the resource allocation function of the financial market. Therefore, it does not coordinate with the national industrial policy and regional policy, which hinders the development of the stock market to a certain extent. In order to support these state-owned enterprises, the investment and financing functions of the stock market have been seriously damaged, resulting in the deterioration of the structural environment of the stock market. The government's interference in the stock market also affects the development of the whole stock market. The development goals of the stock market need to change with the development ideas of the government. China's stock market information disclosure system is not perfect, less predictive financial information disclosure, and low accuracy. The legal system of supervision is not perfect, there is a certain lag and weak effectiveness, and it cannot make the corresponding starting and disclosure of illegal acts in time and effectively. Because of these problems, there are imperfect structure system and system in our stock market (Lei Xei, 2019).

3.5 Regulation and Supervision of China Stock Market

China's securities market supervision system

The supervision system of China's securities market has changed from multi-party and decentralized supervision to centralized and unified supervision. In particular, since the CSRC(China Securities Regulatory Commission) unified the supervision of the market, the scale of China's stock market has been expanding and the system has been improving. In this thesis, the supervision of China's securities market is divided into the following processes.

- Basic establishment of securities market laws and regulations system

On July 1, 1999, the implementation of the securities law marked that China's securities market began to follow the law and rule by law. In recent years, the securities law has played a positive role in ensuring the long-term stable and healthy development of the securities market, protecting the legitimate rights and interests of investors, and maintaining the market order. After the implementation of the securities law, the CSRC will formulate relevant supporting laws and regulations according to the needs of market supervision

- The institutional framework of standardized development is basically formed

China Securities Regulatory Commission has reformed the stock issuance system. First, in terms of the stock issuance system, in 1999, according to the requirements of the securities law, a new issuance audit committee was established, which means that the main underwriter will take more responsibilities, enhance the transparency of the issuance audit work, and then establish the market exit mechanism. On February 22, 2002, according to the company law, China Securities Regulatory Commission began to launch the withdrawal mechanism of listed companies. Third, the CSRC further strengthened the supervision of information disclosure of listed companies, requiring listed companies to disclose their financial status in designated newspapers and on the Internet. Through the system construction in recent years, the system framework of the securities market has been basically formed.

- Initially established a centralized and unified securities regulatory system

On July 1, 1999, China Securities Regulatory Commission (CSRC) agencies were listed, and a centralized and unified securities regulatory system was initially established. In addition, since the promulgation and implementation of the securities law, the exchange and the China Securities Association have played their role in strengthening the self-discipline management of the securities industry and become an important supplement to the centralized and unified securities supervision (Zhihui Dai, 2018).

4 Stock Performance Evaluation of Selected High-Tech Companies

In this chapter, we will focus on evaluation of selected high-tech companies, including the historical performance of stock returns and assessment of future trends. The selected five companies will be evaluated based on the calculation and comparison of risk and return measures such as the holding period return, standard deviation, price-to-earnings ratio, and payout ratio which were described in Chapter 2.3 and 2.4. The main sources of information and data used in this chapter are from China Securities Index Company Limited (CSI) and websites of selected high-tech companies.

4.1 Description of Selected Companies

This chapter will provide information for China's high-tech industry, and describe general situation of five selected companies, including Iflytek Technology, HundSun Technology, YonYou Technology, Glodon Technology, ZTE Corporation.

4.1.1 China's High-Tech Industry

With the development of science and technology and the acceleration of globalization of science and technology, many countries take the high-tech industry as the development focus, and vigorously support and promote the development of high-tech industry. Since the 1990s, Chinese governments have attached great importance to the development of high-tech industry, encouraging and promoting the development of high-tech industry.
In this chapter, we selected five representative listed companies in China's high-tech industry, whose business covers the hot areas of China's high-tech industry in recent years, including artificial intelligence (Iflytek Corporation), computer system integration (HundSun Group), financial technology (YonYou Group), engineering cost (Glodon Group), and communication system research and development (ZTE Corporation).

A. Iflytek Corporation

B. HundSun Group

C. YonYou Group

D. Glodon Group

E. ZTE Corporation

A. Iflytek Corporation

Iflytek Corporation, founded in 1999, is a well-known listed enterprise of intelligent voice and artificial intelligence in Asia. As the largest provider of intelligent voice technology in China, Iflytek has a long-term research accumulation in the field of intelligent voice technology. In 2008, the company was listed on Shenzhen Stock Exchange (stock code: 002230).

B. HundSun Group

HundSun Group was founded in Hangzhou in 1995 and listed on Shanghai Stock Exchange (stock code: 600570) in 2003. It is a leading financial software and network service provider in China, providing overall IT solutions and services for financial institutions such as securities, banks, funds, futures, trusts, insurance, and providing wealth management tools for individual investors.

C. YonYou Group

YonYou Group, (stock code: 600588), founded in 1988, is the world's leading enterprise cloud service platform and the largest comprehensive enterprise cloud service platform in China. It has provided enterprise cloud services to more than 5.22 million enterprises and public organization customers. More than 60% of China's top 500 enterprises use YonYou software.

D. Glodon Group

Glodon Group was founded in 1998 and listed on Shenzhen Stock Exchange in May 2010 (stock code: 002410). It is the first listed company in China's construction engineering informatization field. The company has established more than 60 subsidiary companies around the world, serving customers in more than 100 countries and regions, with more than 6000 employees and 200 sales and service networks around the world More than one city

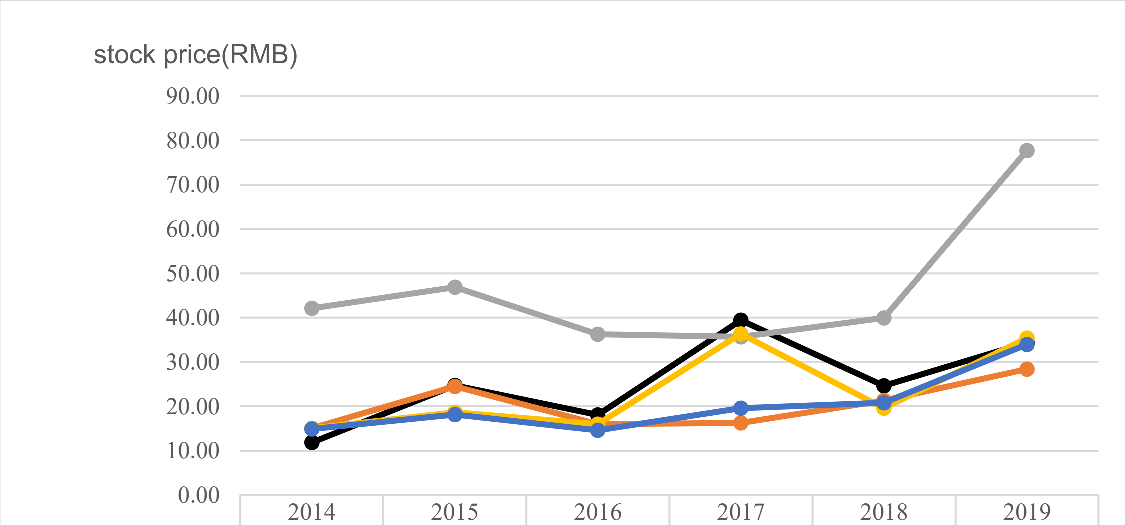
E. ZTE Corporation

ZTE Corporation is the world's leading provider of integrated communication solutions. Founded in 1985, it is a large communication equipment company listed in Hong Kong and Shenzhen. The company provides innovative technology and product solutions for telecom operators and enterprise network customers in more than 160 countries and regions.

4.1.2 Historical Stock Price of Selected Companies

In this section, we will analyse the change of stock price from the aspects of company operation, government policy, international environment, RMB exchange rate, etc. In order to show the growth or decline of the stock price more intuitively, we will make a chart. The five companies we select is Iflytek Technology (Iflytek), HundSun Technology (HundSun), YonYou Technology (YonYou), Glodon Technology (Glodon), ZTE Technology (ZTE). The stock prices for the whole period are summarized in Annex 1.

Figure 4.1 Stock Price of High-Tech Companies Every End of the Year (2014-2019)



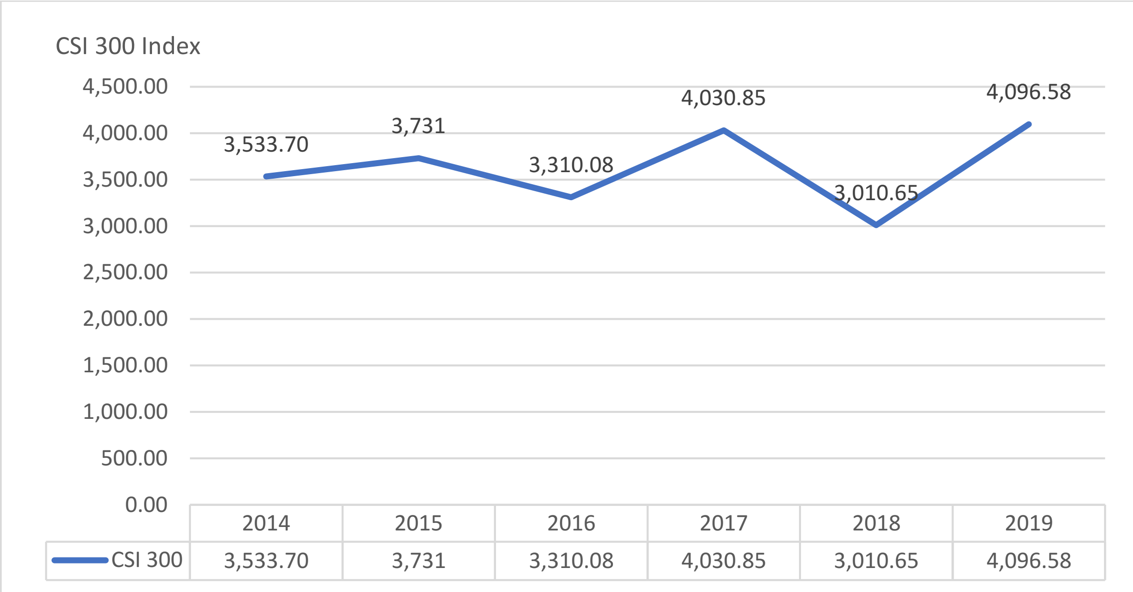
	2014	2015	2016	2017	2018	2019
IFLYTEK	11.84	24.7	18.06	39.43	24.64	34.38
YONYOU	15.058	24.469	16.015	16.269	21.3	28.4
HUND SUN	42.12	46.90	36.26	35.69	39.99	77.73
ZTE	15.05	18.63	15.95	36.36	19.59	35.39
GLODON	14.93	18.18	14.6	19.6	20.81	33.98

Source: Author

CSI 300 Index

Shanghai and Shenzhen 300 Index (CSI 300) is an index jointly issued by Shanghai and Shenzhen Stock Exchange on April 8, 2005, which reflects the overall trend of A-share market. The objective of the CSI 300 index is to reflect the general picture and operation of stock price changes in China's stock market, and to serve as an evaluation standard for investment performance. The sample of CSI 300 index covers about 60% of the market value of Shanghai and Shenzhen stock market, and it has good market representation.

Figure 4.2 CSI 300 Index Every End of the Year



Source: Author

In Figure 4.1, we can find that from 2014 to 2015, the stock price of the five companies we selected rose. From Figure 4.2, as a "barometer" reflecting the overall trend of Shanghai and Shenzhen stock markets, we can also find that compared with 2014, the CSI 300 index rose slightly in 2015. The speed of China’s economic growth began to slow down, the growth rate of national GDP and fiscal revenue is declining, and the debt risk is also rising. In response to the economic downturn, the state has introduced a series of measures. As the three largest Internet companies in China, Alibaba, an e-commerce giant, Tencent, a social media and game company, and Baidu, a search service provider, continued to make large acquisitions and establish alliances in 2014, expanding the field of competition. Alibaba has expanded its investment portfolio to include television and movie production, video calling applications and online maps. Tencent's acquisitions include Jingdong, China's second-largest e-commerce company, and a mobile game company in South Korea. Baidu's investments include Uber, an American car rental app, an Israeli camera company. Under the heat wave, the market value of high-tech companies keeps rising. Among them, through the annual report from Iflytek's website, in 2015, the total operating revenue of Iflytek increased by 40.87% over the previous year, and the rise of stock price is also the largest of the five selected companies. In 2015, as a result of the substantial reduction of foreign exchange reserves, the RMB has experienced the largest depreciation since the record, and a large amount of capital flowed out of China, which impacted the stock market and reduced the demand of the stock market. At the same time, due to the impact of the international economic downturn, China's exports decreased seriously, and the stock market was generally depressed. From Figure 4.2, we can see that the CSI 300 index has fallen sharply from 3731 in 2015 to 3310.08 in 2016, which partly reflects the downturn in China's stock market during this period.

From 2016 to 2017, except for HundSun Technology, the stock prices of the other four companies have increased to varying degrees. In the last trading day of 2017, the CSI 300 rose by 21.78% Compared with the previous year, which represents China 's stock market has recovered to a certain degree from the previous year 's downturn. The share price of Iflytek rose by 118.3%. This is because at the 2017 National People 's Congress and the Chinese People 's Political Consultative Conference, China decided Artificial intelligence is an important area for future development, and Iflytek is the largest artificial intelligence research and development company in China.

At the beginning of 2018, the United States announced to launch a trade war against China, raising tariffs has seriously affected the trade of goods and services, and the resulting economic downturn has also affected the confidence of investors. The U.S. Department of Commerce announced to impose sanctions on a number of Chinese high-tech companies, including ZTE and Iflytek, as industry leaders, which have been subject to a number of sanctions including fines ZTE's stock price fell 85.6% from 36.36 in 2017 to 19.59 in 2018. In addition, the trade war also has a certain impact on the A-share market. Under the comprehensive effect, the CSI 300 index has fallen sharply, down to the valley.

At the beginning of 2019, the people's Bank of China announced that it would cut interest rate by 0.5% and release RMB 1.5 trillion, a considerable part of which will enter the stock market. At the same time, the trade war between China and the United States has also been eased to some extent. China's commodity exports are far higher than expected, the RMB continues to appreciate, and a large number of foreign capital flows into the Chinese market, CSI 300 reached the highest on the record. The stock price of HundSun Technology rose from 39.99 in 2018 to 77.73 in 2019. According to the annual report in

HundSun's website, the net profit increased by 125.85% over the previous year. The stock prices of the other four companies also rose to different degrees in 2019.

4.2 Comparison of Return and Risk

In this chapter, we will calculate and compare risk and return of the five high-tech companies we selected, first, we will calculate the holding period return of the five selected high-tech companies for each year, and then we will calculate the risk of the five selected companies by calculating standard deviation.

4.2.1 Calculation of Returns

In this section, we will calculate average monthly returns of five high-tech companies we selected using the formula (2.3). After that, we will create graph for comparison, and we will analyse the stock returns from the policy and the company's business strategy.

Table 4.1 Average Monthly Returns (2014-2019)

Iflytek	YonYou	HundSun	ZTE	Glodon
2.27%	2.83%	3.73%	2.81%	1.63%

Source: Author

We can intuitively compare the average monthly returns of selected high-tech companies according to table 4.1, HundSun's average monthly return ranks the first among those five companies, reaching to 3.73%, as the only full-range financial IT service provider in China, HundSun has an unshakable position in the technical field. The second and third places are YonYou and ZTE, and their average monthly returns are very close, only 0.02 percentage points different. The fourth is Iflytek. In recent years, Iflytek 's business has developed rapidly, and it has established multi-faceted cooperation with leading global multinational companies such as Microsoft and Tencent. Compared with the above four high-tech companies, Glodon 's monthly average return is slightly lower, ranking last. The monthly returns of five companies for the whole period are summarized in Annex 2.

Through the average monthly return, we have a general understanding of the return situation of these five high-tech companies. Next, we will further compare the situation and condition of these five high-tech companies by calculating annual HPR and cumulative returns.

Table 4.2 Annual (HPR) and Cumulative Returns (2014-2019)

	Iflytek	YonYou	HundSun	ZTE	Glodon
2014	-16.62%	43.01%	148.67%	36.08%	-32.87%
2015	73.30%	12.14%	1.96%	16.58%	-10.39%
2016	7.05%	11.75%	18.23%	11.23%	-43.30%
2017	118.81%	10.79%	4.83%	140.00%	23.45%
2018	-32.75%	20.34%	0.95%	-37.05%	36.85%
2019	26.35%	17.89%	62.01%	75.98%	27.50%
six-year cumulative returns	147.82%	209.24%	425.38%	254.16%	79.86%

Source: Author

In table 4.2, we can clearly see that for the annual returns and cumulative returns of five high-tech companies from 2014 to 2019. Among the five companies, HundSun's cumulative returns reached 425.38%, leading the other four companies with a huge advantage. In general, HundSun has adopted three measures to enhance the company's competitiveness. The first is to increase the cost of research and development. In 2014, the cost of research and development accounted for 40% of the company's total revenue. The second was to expand the scope of the business and increase Profit channel. The original model was to sell software, provide financial services and charge management fees. In 2014, HundSun decided to provide IT technology services and charge cooperation fees. The third was to develop a new trading system. In 2015, the trading system developed by HundSun began to be put into use. This system can allocate funds under a securities account into several independent sub-accounts for trading and accounting. This system quickly occupied the monopoly position of the market due to its convenient funding and risk control functions. Due to the strong support of national policies, a large amount of capital has poured into the stock market, and the stock market is booming. Many shareholders have borrowed money for leveraged transactions. In the second half of 2015, due to weak supervision, the Chinese stock market as a whole plummeted, and HundSun's trading system was considered as a platform for illegal transactions, HundSun was fined 400 million yuan, and the stock returns dropped sharply, we can find that the

HPR of HundSun fluctuates greatly. In 2014, the HPR of HundSun reached 148.67%, but in 2015, it was only 1.96%. It was not until September 2015 that the Chinese government issued a series of policies to rectify the stock market. Compared with 2015, the HPR of HundSun increased significantly in 2016, reaching 18.23%. This also confirms that as a non-recurring loss, the punishment does not have a significant impact on HundSun's competitiveness and profitability. The annual report of HundSun in 2019 shows that the net profit of HundSun reached 678 million yuan, an increase of 125.85% over the same period of the previous year. Investors held optimistic expectations for HundSun.

ZTE ’s cumulative return ranks second among these five high-tech companies. As the world's leading provider of comprehensive communication solutions, ZTE's business scope covers 160 countries, with a patent application volume of 74000, these factors keep ZTE in a strong competitive position in the high-tech industry. From table 4.2, we can see that in the past six years, ZTE's HPR remains positive except 2018. ZTE's stock price fell sharply in 2018, close to the stock price started in 2016, and we can find ZTE’s HPR in 2018 is -37.05%. This is mainly due to the impact of the Trade war between America and China, although the issue of trade between China and the United States has always existed, in 2018, the trade war between the United States and China once again reached its climax. The rise in export tariffs on products has caused increased costs. The company had to increase the selling price, although this would affect the sales of its products. ZTE was penalized by the U.S. Department of Commerce for USD 890 million in 2018 and was banned from purchasing some raw materials from the United States. Due to the difficulty in supplying raw materials, ZTE had to find Other supply channels, which also have a huge impact on ZTE's operations, this is the main reason for ZTE's HPR to fall sharply in 2018. From Figure 4.1, we can find that ZTE ’s stock price rebounded rapidly after a brief downturn in 2018, and continued to rise, which also shows investors' confidence in ZTE has been restored.

YonYou and Iflytek are in third and fourth positions respectively. According to data from China Securities Index Company Limited (CSI), YonYou achieved total operating revenue of RMB 4.548 billion in the first three quarters of 2018, increased of 38.8% over the same period of the previous year. YonYou is a comprehensive, integrated and ecological enterprise, the advantages of the service platform have become increasingly prominent, further consolidating its leading position in the enterprise service market. In 2019, YonYou's total operating income exceeded 10 billion yuan.

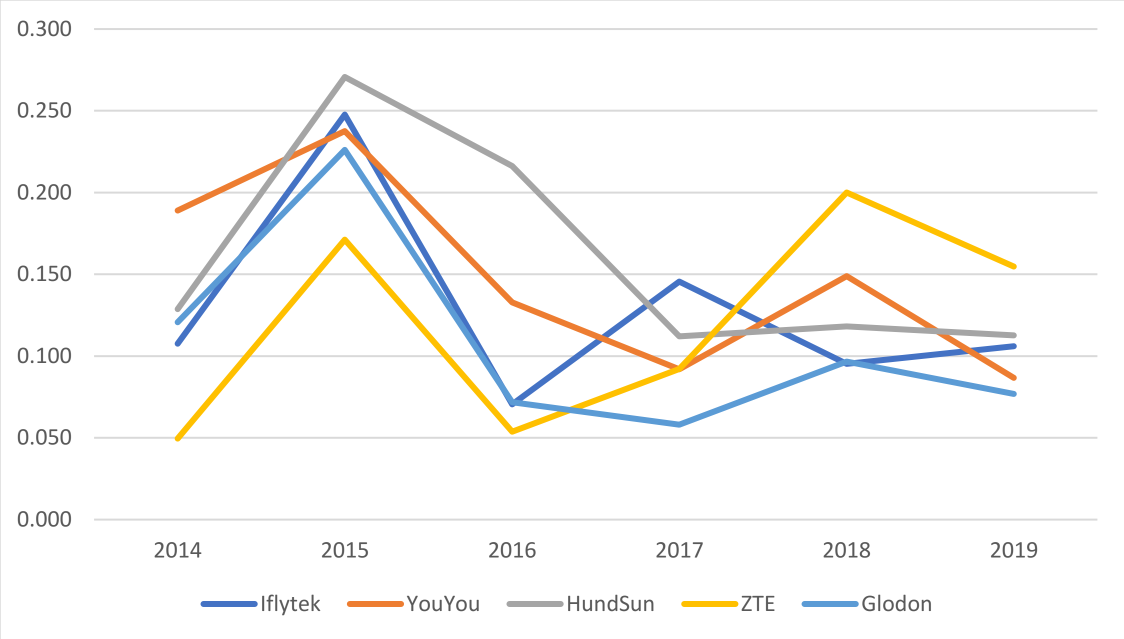
In 2017, the stock returns of selected high-tech companies rose overall. Among them, Iflytek's stock returns rose the most rapidly, in 2017, Iflytek's HPR reached 118.81%. This is because Iflytek adopted a development strategy that keeps pace with the times. First, Iflytek combines artificial intelligence with education and medical treatment, and puts it into use in hospitals and schools across China. Second, Iflytek actively develops overseas markets. Its translation machines are sold in more than 130 countries around the world. Due to the rapid technological progress of Iflytek, it has received a government subsidy of 100 million yuan, which has greatly strengthened investment confidence. Not only that, the Iflytek also actively invested in the research and development of automotive systems, and other areas involved in the company are also developing rapidly, which also made Iflytek stock returns from 2016 to 2017 show an upward trend. In 2019, Iflytek's operating income also exceeded 10 billion yuan for the first time, a year-on-year increase of 27.30%.

Glodon ranked fifth with 79.86% of cumulative rate of return, we can see that from 2014 to 2016, Glodon 's annual return was always negative, and it did not improve until 2017. Due to the rapid development of the construction industry, construction products are becoming more complex, structural and functional requirements are diverse, new equipment is constantly emerging, and the level of intelligence is becoming higher and higher. The contradiction of the low level of digitalization and rapid development of the construction has become increasingly prominent, and Glodon has not made technical breakthroughs, under the general trend of digital transformation in various industries, the application of digital technology in the construction industry is much lower than that in other industries, which has also led to the continuous shrinking of the market share of Glodon. Compared with the other four high-tech companies, the development of Glodon is relatively slow. The cumulative returns based on monthly returns of five companies for the whole period are summarized in Annex 3.

4.2.2 Volatility of Selected Stocks

The return which the investor should aim for is more or less proportionate to the degree of risk he is ready to run. Most people's mindset is to take the minimum investment risk and get the highest return possible. Therefore, in financial activities, we should control risks as much as possible and take measures to reduce risks. In this section, we will evaluate the investment risk and compare it to determine which company has lower risk and discuss the relationship between stock volatility and stock return by comparing the standard deviation based on monthly returns and average monthly return (Graham, 2006).

Figure 4.4 Standard Deviation of Monthly Returns (2014-2019)



Source: Author

Table 4.3 Standard Deviations (2014-2019)

Iflytek	YonYou	HundSun	ZTE	Glodon
0.129%	0.148%	0.160%	0.120%	0.108%

Source: Author

According to table 4.1 and table 4.3, we can clearly see that HundSun's standard deviation is the largest of the five high-tech companies, reaching 0.16, and HundSun's average monthly return is also in the leading position, reaching 3.73%. If the fluctuation of prices is higher, it means the higher risk it is. By observing figure 4.1, we can find that the stock price of HundSun nearly doubled from 2014 to 2019, from 42.12 at the beginning of 2014 to 77.73 at the end of 2019, which also has several major changes during this time period. Therefore, compared with the stocks of other high-tech companies, HundSun's stock is the most risky. Accordingly, HundSun also has the highest return. For investors with strong risk tolerance, HundSun is a good choice.

YonYou and Iflytek ranked second and third respectively. We can see that YonYou's standard deviation is 0.148, Iflytek's standard deviation is 0.129, and the average monthly return rates are 2.83% and 2.27%, respectively, ranking second and fourth, ZTE ranks third in terms of average monthly return.

Based on the observation of figure 4.4, we can see that compared with the other four high-tech companies, the standard deviation fluctuation of Glodon is smaller, Glodon's average monthly return is 1.63%, which also is the lowest of the five high-tech companies we selected, and also corresponds to the lowest standard deviation. At the same time, due to the low price of a single stock, Glodon is an ideal investment target for investors with low risk tolerance and small investment scale. Based on our calculation and comparison, we can find there is a positive correlation between stock volatility and returns. Investors should choose investment objects rationally according to their own risk tolerance and expected return.

4.3 Market Indicators of Selected Stocks

In this section, we will analyse the financial performance of the five high-tech companies we selected by calculating the price-to-earning ratio and payout ratio.

4.3.1 P/E Ratio

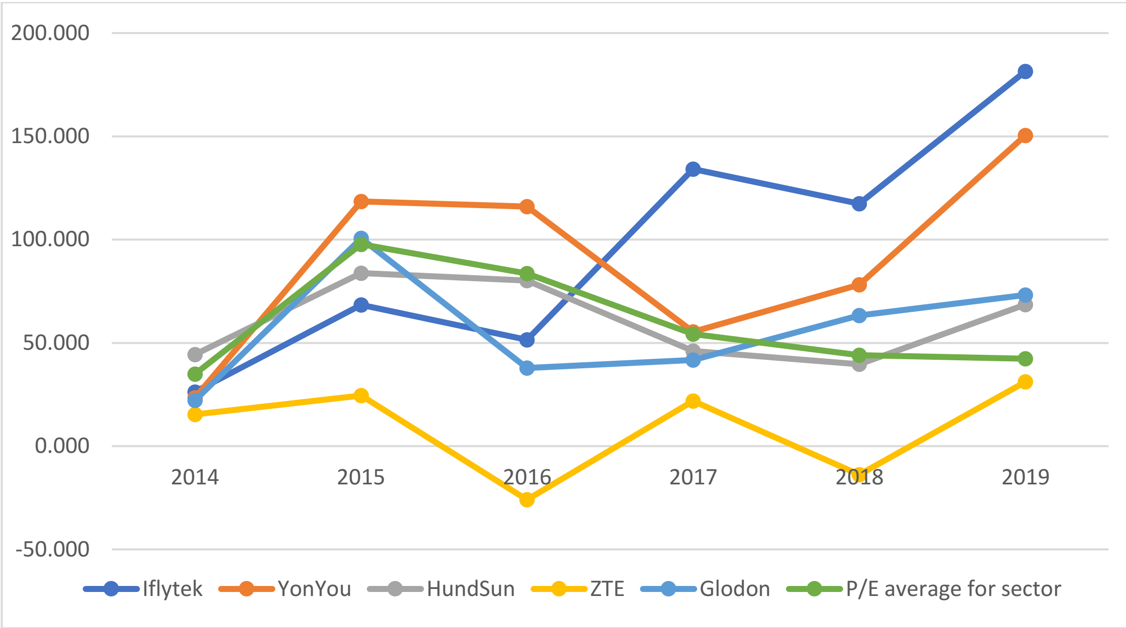
We can use formula 2.6 to calculate the annual price-earnings ratio of each company and use this as a basis to analyse the operating status of each company. In this work, the annual P/E ratio is calculated by dividing the average stock price of each company by the earnings per share of each company each year.

Table 4.4 P/E ratio of five high-tech companies

	2014	2015	2016	2017	2018	2019
Iflytek	26.273	68.441	51.498	134.091	117.441	181.509
YonYou	23.417	118.512	116.017	55.283	78.159	150.481
HundSun	44.280	83.785	80.143	45.985	39.641	68.526
ZTE	15.371	24.482	-25.956	21.849	-13.801	31.105
Glodon	22.128	100.605	37.776	41.740	63.291	73.166

Source: Author

Figure 4.5 P/E Ratio



Source: Author

The economic connotation of P/E ratio shows that P/E ratio is a comprehensive index representing the growth and profitability of the company, reflecting the difference between the current profitability and the future profitability, and reflecting the current situation and development potential of the company (Ran Liu, 2011). According to table 4.4 and figure 4.5 and the average P/E ratio of China's high-tech industry published by China securities index corporation, we can see that Iflytek's P/E ratio from 2014 to 2016 is always lower than the industry average, which shows that investors are not optimistic about Iflytek's prospects from 2014 to 2016. Since 2017, Iflytek's P/E ratio has increased significantly, even though it fell in 2018, it is far higher than the industry average. The P/E ratio can show the market's expectation for the company's development prospect to a certain extent, while Iflytek's development prospect is obviously underestimated in this period of time. The AI enterprise has the characteristics of high risk and high uncertainty. The success rate of scientific research and the future prospect of project investment are difficult to predict, which may bring considerable profits to the enterprise and risks that cannot be accepted by the market. Due to the good growth and high-performance growth of high-tech enterprises, the average P/E ratio of high-tech industry is much higher than that of general industry, but the P/E ratio of Iflytek in 2017 and 2019 is still too high compared with the industry average. High P/E ratio may indicate the false high of stock price.

Based on the observation of figure 4.1, we confirm this conjecture. Iflytek's stock price fell from 39.43 in 2017 to 24.64 in 2018, which shows that investors have too high expectations for it. The main reason for this situation is that many investors believe that the artificial intelligence industry has a broad prospect and will play a more and more important role in the future economic life. However, the concept of artificial intelligence has only been known by people in recent years. Related products have not been widely used. Many products are still in research and development, and investors' expectations are too high.

In contrast, the P/E ratio of HundSun electronics is much more stable. In the period we choose, the P/E ratio of HundSun electronics is always very close to the industry average P/E ratio. In view of the development of HundSun in recent years, the company is very worthy of investment. From figure 4.1, we can see that the stock price of HundSun is stable and the risk is small. In terms of policy, China has always attached great importance to the financial industry and vigorously support the development of the software industry. As the largest financial system provider in China, HundSun is also the only financial software enterprise with full license. It has strong innovation and development potential, and it will also bring greater opportunities and challenges to HundSun.

For YonYou, from figure 4.5, we can see that since 2014, the price earnings ratio of YonYou has always been higher than the industry average price earnings ratio. In 2016, the average price earnings ratio of high-tech industry fell sharply, but the price earnings ratio of YonYou network only changed slightly. According to the 2016 China Management software market report released by CCID (China Center for Information Industry Development), the share of YonYou network in China's management software market is 2 5%, and this proportion is still growing. The high growth of the company that has become the largest market share among Chinese management software manufacturers for seven consecutive years has strengthened investors' confidence in investment. In addition to the company's growth, the current earnings will also have a certain impact on investors' expectations. ZTE's P/E ratio is always lower than the industry average. In 2016 and 2018, ZTE's P/E ratio even fell to a negative number. In early March 2016, ZTE was banned from purchasing raw materials from some U.S. enterprises due to its violation of the agreement with the U.S. Department of Commerce, the product production and supply was affected seriously. At the beginning of 2018, trade frictions between China and the United States intensified. As the industry leader of China's communication technology, ZTE was once again sanctioned by the U.S. government. In those two years, ZTE has been in a state of loss. The P/E ratio of Glodon has always been in a state of recovery after a sharp decline in 2015. We can see that this trend is exactly the opposite of the development of the industry's average P/E ratio, which shows that investors have full confidence in Glodon. As the first listed company in the field of construction engineering informatization in China, Glodon played an irreplaceable role in the industry. According to the annual report of Glodon's official website, in the first three quarters of 2017, Glodon achieved operating income of 1.409 billion yuan, an increase of 12.11%, this data is still growing, the company continues to grow steadily.

4.3.2 Payout Ratio

As formula 2.7, we can calculate the payout ratio of selected stocks for each year and make a comparison of selected stocks based on this measure.

Table 4.5 Payout Ratio

	Iflytek	YonYou	HundSun	ZTE	Glodon
2014	0.319	0.638	0.310	0.260	0.505
2015	0.294	0.652	0.356	0.321	0.938
2016	0.270	0.929	0.333	0.000	0.796
2017	0.303	0.556	0.356	0.303	0.592
2018	0.000	0.781	0.308	0.000	0.510
2019	1.111	0.000	0.000	0.000	0.000

Source: Author

Dividends can increase investor returns and boost confidence in the capital market. They are also an important indicator of a mature stock market. Payout ratios can help investors determine whether the dividends paid by a company can be maintained for a long time. The payout ratio of new companies is usually low. In general, shareholders wanted more liberal dividends, while the managements preferred to keep the earnings in the business “to strengthen the company”, which also means that the higher the dividend payout ratio, the heavier the company's financial burden. Due to the limited investment opportunities, companies entering the mature period have a relatively high dividend payout ratio. Many investors prefer companies with lower dividend payout ratios because they can continue to pay current dividends even if the company's earnings decline, and companies with lower payout ratios are likely to increase dividends over time, if the company's dividend payout ratio is higher than 100%, which means that the company's dividends to investors exceed the income. This is not a sign of sustainable development. Investors should not only pursue high dividend ratio, but also consider the impact of high dividend ratio on the future operation of the company (Graham, 2006).

Technological innovation is a powerful driving force for industrial development, from 2014 to 2019, the average annual profit of China's high-tech industry has increased by about 7.5%. In the future, the rapid development of China's high-tech industry will continue, with the advent of the technological revolution and the acceleration of industrial changes, countries around the world will pay more attention to the development of high-tech industries. By strengthening the forward-looking layout of high-tech industries, they will promote the development and innovation of high-tech industries from policy promulgations and budget increases.

It can be seen from table 4.5 that from 2014 to 2016, the dividend payout ratio of Iflytek has been decreasing year by year, which means that the company's retained earnings for reinvestment are increasing. In addition to expanding the company's existing business, Iflytek 's online education platform, intelligent medical robots are put into use in major schools and hospitals in China. At the same time, Iflytek also actively expands overseas markets. In 2017, Iflytek's products were sold in more than 130 countries around the world. In 2017, Iflytek's dividend payout ratio increased, which also echoed that the company's reinvestment in the past few years was more effective and the company's net profit continued to increase. In 2018, Iflytek did not pay dividends. As can be seen from Figure 4.1, Iflytek's share price fell from 39.43 in 2017 to 24.64 in 2018. This is because Iflytek's main business translation technology was questioned as fraud in 2018. Although Iflytek has clarified, this news has affected the confidence of investors. According to Iflytek's annual report in 2019, Iflytek made a profit of 788 million yuan, an increase of 45% over the previous year, this is also a powerful response to external doubts.

For YonYou, the dividend payout rate was the highest in 2016. Due to the slowdown of China's domestic industrial economic growth in 2015, weak market demand growth, and increased internal and external constraints, in this context, China's high-tech industries are in "Made in China 2025" Under the active guidance of national strategies such as Internet and "Internet +", China will use innovation to promote industrial development, reduce income taxes on high-tech industries, and issue direct subsidies. These measures have helped the development of high-tech industries. According to YonYou 's 2015 annual report, revenue in the first three quarters of 2015 was 5 billion yuan, an increase of 10% year-on-year, of which the cloud business part was nearly 800 million yuan, an increase of 125% year-on-year, which also shows that YonYou 's new business is developing very quickly.

For Glodon, the dividend payout ratio in 2015 has increased significantly compared to 2014, which is related to the recovery of the Chinese real estate industry in 2015. Due to the interest rate reduction and tax reduction policies of the Chinese real estate industry in 2015, the transaction volume of commercial housing reached the highest level since 2005. As the main business of Glodon, the sales volume of construction engineering software increased significantly in 2015. 51% of Glodon's revenue comes from construction engineering software.

For HundSun, the company's dividend payout ratio is relatively stable. HundSun's main business is fintech products. As the China Securities Regulatory Commission continues to strengthen the supervision of the stock market, the scope and functions of supervision continue to expand, making the supervision itself more effective, and the demand is also rising. In the long run, the strengthening of supervision is conducive to the standardized operation of the capital market, increasing investor confidence, and thus increasing the activity of the capital market, which is conducive to the demand for fintech products. For ZTE, the company's dividend payout ratios in 2016, 2018 and 2019 are all zero, which also reflects the company's urgent need for a large amount of retained earnings in the past three years, reducing external debt and thus reducing company funds.

5 Conclusion

Starting from the basic principles of investment, this work describes the five selected high-tech companies in terms of external environment, industry environment and financial situation.

Based on the above calculation data, we can draw the following conclusion: through the calculation and comparison of the rate of return, we can see that among the five high-tech companies, HundSun ranks first in the cumulative return and ZTE ranks second. Therefore, from the perspective of stock return, among the selected high-tech stocks, HundSun and ZTE are worth investing. After that, we compared the risk of investment by calculating the standard deviation. In contrast, the investment risk of Glodon is the smallest. Correspondingly, the return of Glodon is the smallest. For investors with strong risk tolerance, they can choose HundSun or ZTE. Next, we compared the dividend payout ratio of the five stocks. The dividend ratio of YonYou, Glodon and HundSun is relatively stable. These three companies are a better choice for investors who have long-term investment plan and seeking stable dividends. From the perspective of P/E ratio, HundSun and Glodon are relatively stable, with lower risk and broad prospects. Secondly, through the calculation and comparison of P/E ratio, we can find that even in high-tech industries with high P/E ratio, Iflytek's P/E ratio is still too high, which is not a normal phenomenon, the stock price of Iflytek may be overestimated.

Since the 21st century, driven by technological innovation and rapid growth of demand, China's high-tech industry has shown a rapid development trend, and gradually formed a complete industrial system. From the perspective of development trend, China's high-tech industry has broad prospects and huge potential. In the future, as China's economy turns to the stage of high-quality development and people's living standards continue to improve, the demand for high-tech products such as artificial intelligence will rise rapidly, and the development of China's high-tech industry will continue to maintain rapid growth.

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List of Abbreviations

SZSE	Shenzhen Stock Exchange
SSE	Shanghai Stock Exchange
GDP	Gross Domestic Product
HPR	Holding Period Return
P/E	Price-earnings ratio
Iflytek	Iflytek Corporation
HundSun	HundSun Group
YonYou	YonYou Group
Glodon:	Glodon Group
ZTE	ZTE Corporation
CSI	China Securities Index Company Limited

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List of Annexes

Annex 1 Stock prices of 5 high-tech companies from 2014 to 2019
Annex 2 Cumulative returns based on monthly returns from 2014 to 2019
Annex 3 Monthly returns of 5 high-tech companies from 2014 to 2019

Annexes

Annex 1 Stock prices of 5 high-tech companies from 2014 to 2019

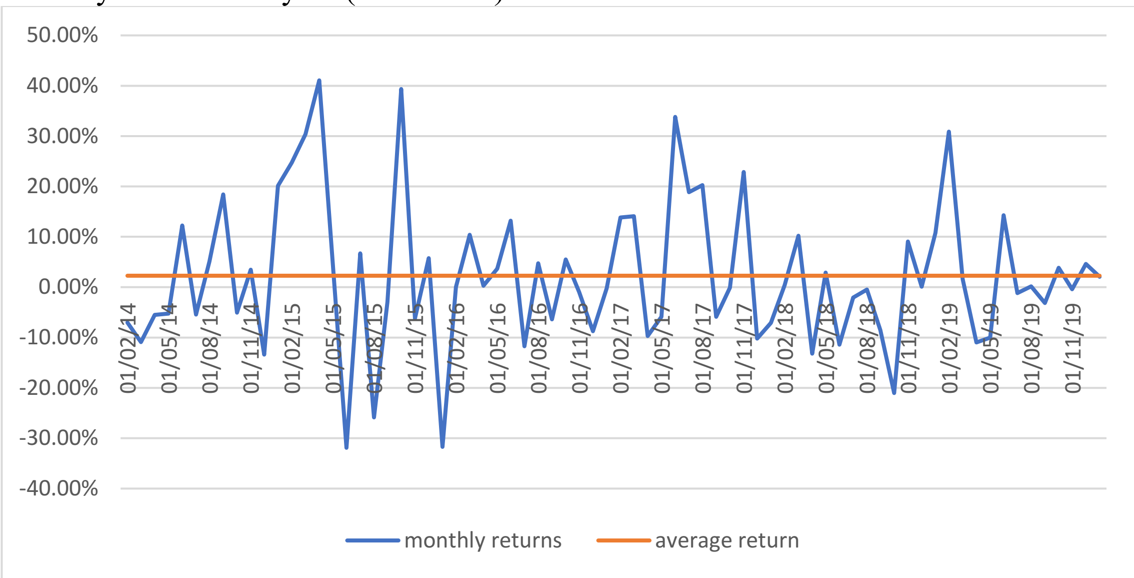
Time	Iflytek	YonYou	HundSun	ZTE	Glodon
01.01.2014	14.20	10.53	16.94	11.06	22.24
01.02.2014	13.20	12.17	15.63	10.96	19.14
01.03.2014	11.76	9.23	16.52	10.53	17.33
01.04.2014	11.11	8.35	19.65	10.98	15.86
01.05.2014	10.53	9.87	21.32	10.96	17.05
01.06.2014	11.82	9.02	22.62	10.93	17.63
01.07.2014	11.18	9.74	22.16	11.56	18.42
01.08.2014	11.75	10.30	24.22	11.63	17.76
01.09.2014	13.91	10.70	32.45	12.63	18.18
01.10.2014	13.21	11.34	31.86	12.67	16.07
01.11.2014	13.67	15.76	42.70	13.07	15.69
01.12.2014	11.84	15.06	42.12	15.05	14.93
01.01.2015	14.22	21.82	46.00	15.98	19.93
01.02.2015	17.73	25.53	59.55	17.13	20.22
01.03.2015	23.11	29.26	83.75	18.22	27.67
01.04.2015	32.60	31.87	96.13	25.96	25.46
01.05.2015	34.20	45.41	93.94	25.73	31.93
01.06.2015	23.29	35.29	86.19	19.84	23.40
01.07.2015	24.85	30.13	50.70	19.98	25.11
01.08.2015	18.42	19.91	38.29	16.75	15.40
01.09.2015	17.87	18.58	33.60	15.60	16.70
01.10.2015	24.90	23.05	49.78	17.85	16.35
01.11.2015	23.35	21.77	49.13	17.48	19.21
01.12.2015	24.70	24.47	46.90	18.63	18.18
01.01.2016	16.87	14.33	30.67	14.34	11.30
01.02.2016	16.87	12.52	26.78	13.68	11.74
01.03.2016	18.62	16.05	44.88	15.06	13.54
01.04.2016	18.67	14.70	41.98	14.23	13.12
01.05.2016	19.35	14.63	47.05	13.78	12.95
01.06.2016	21.90	15.06	51.36	14.34	14.30
01.07.2016	19.33	17.45	43.22	14.56	15.22
01.08.2016	20.25	20.15	45.55	14.68	16.95
01.09.2016	18.95	17.40	43.03	14.78	15.69
01.10.2016	19.99	17.51	45.41	15.30	15.76
01.11.2016	19.79	19.09	43.91	16.84	15.73

01.12.2016	18.06	16.02	36.26	15.95	14.60
01.01.2017	18.02	14.69	34.05	15.15	13.95
01.02.2017	20.51	14.78	35.82	15.80	15.00
01.03.2017	23.40	13.69	32.50	16.96	14.91
01.04.2017	21.13	13.19	30.00	17.76	15.87
01.05.2017	19.88	11.67	28.75	19.53	17.29
01.06.2017	26.60	13.17	35.91	23.74	18.80
01.07.2017	31.61	13.81	32.50	22.95	17.24
01.08.2017	38.01	16.05	39.49	23.86	18.71
01.09.2017	35.77	18.20	39.26	28.30	20.45
01.10.2017	35.73	17.85	39.29	32.29	19.83
01.11.2017	43.91	15.76	36.12	33.08	19.72
01.12.2017	39.43	16.27	35.69	36.36	19.60
01.01.2018	36.64	17.70	39.61	31.12	19.09
01.02.2018	36.79	25.21	36.72	32.24	21.66
01.03.2018	40.55	29.38	45.99	30.15	25.37
01.04.2018	35.19	28.29	46.83	31.31	25.26
01.05.2018	36.21	24.60	44.38	30.34	26.90
01.06.2018	32.07	24.51	40.73	13.03	27.73
01.07.2018	31.41	25.80	39.35	14.60	27.50
01.08.2018	31.25	27.89	41.03	19.09	29.80
01.09.2018	28.57	27.82	42.47	18.30	26.78
01.10.2018	22.57	23.99	35.95	16.93	24.16
01.11.2018	24.62	23.65	41.69	19.87	22.89
01.12.2018	24.64	21.30	39.99	19.59	20.81
01.01.2019	27.29	24.09	47.98	20.11	24.34
01.02.2019	35.71	23.44	66.49	29.80	26.63
01.03.2019	36.29	26.08	67.35	29.20	29.81
01.04.2019	32.31	24.28	63.88	32.15	28.00
01.05.2019	29.08	22.83	62.34	28.76	28.98
01.06.2019	33.24	26.88	68.15	32.53	32.89
01.07.2019	32.85	28.75	71.09	32.92	35.08
01.08.2019	32.90	32.07	74.30	28.81	36.10
01.09.2019	31.86	30.89	73.93	32.01	35.49
01.10.2019	33.09	29.57	76.26	33.40	31.90
01.11.2019	32.96	27.76	72.81	30.71	33.02
01.12.2019	34.48	28.40	77.73	35.39	33.98
01.01.2020	35.19	32.56	88.69	39.17	40.00

Source: https://cn.investing.com/, Author

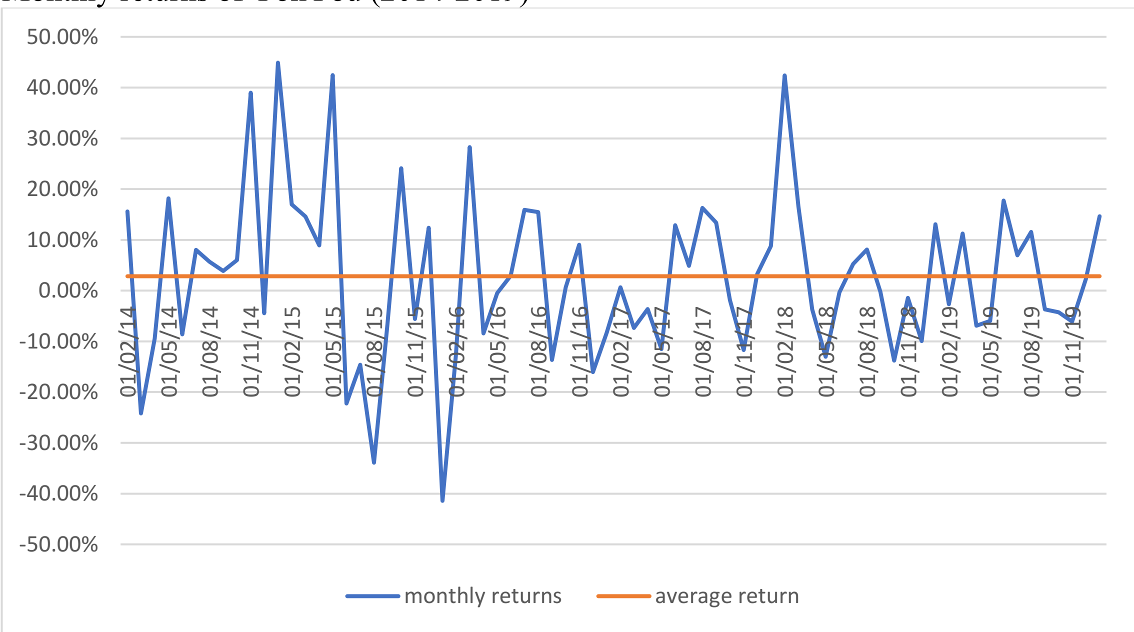
Annex 2 Monthly returns of 5 high-tech companies from 2014 to 2019

Monthly returns of Iflytek (2014-2019)



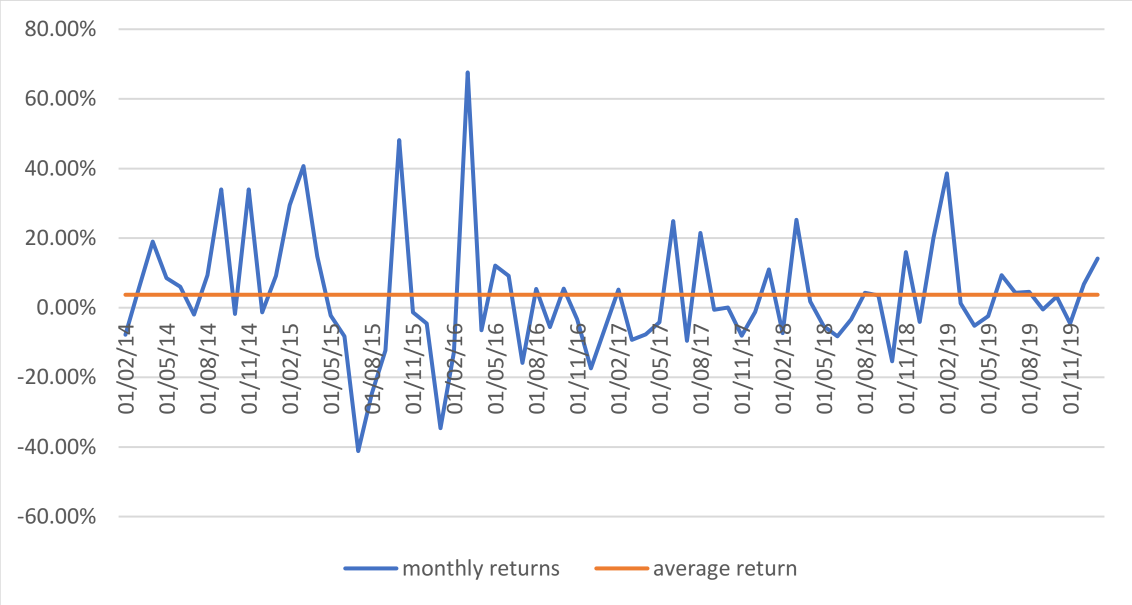
Source: Author

Monthly returns of YonYou (2014-2019)



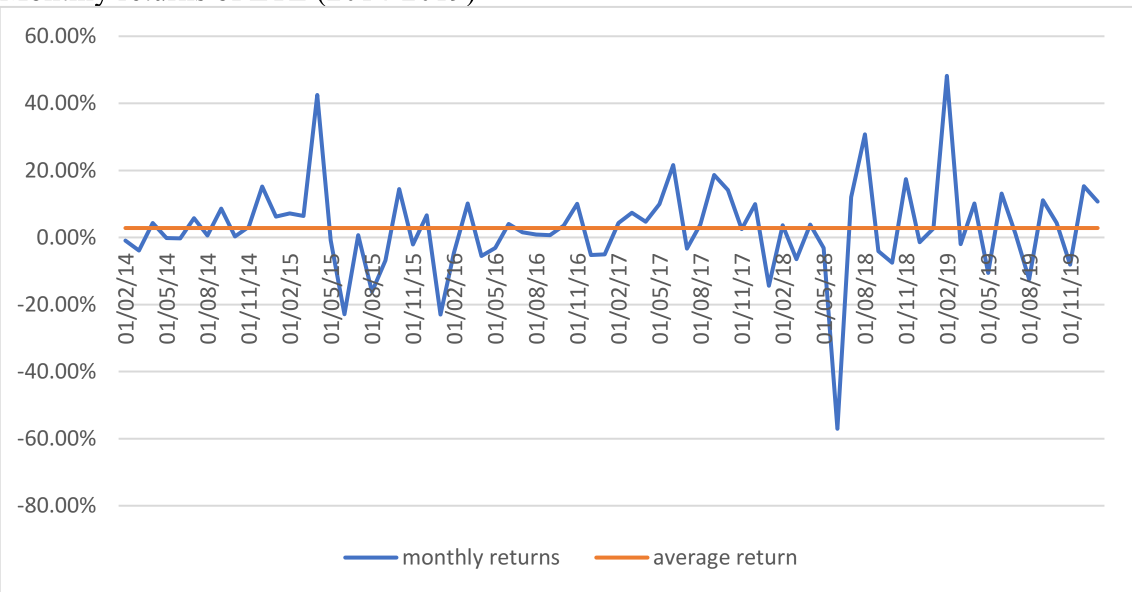
Source: Author

Monthly returns of HundSun (2014-2019)



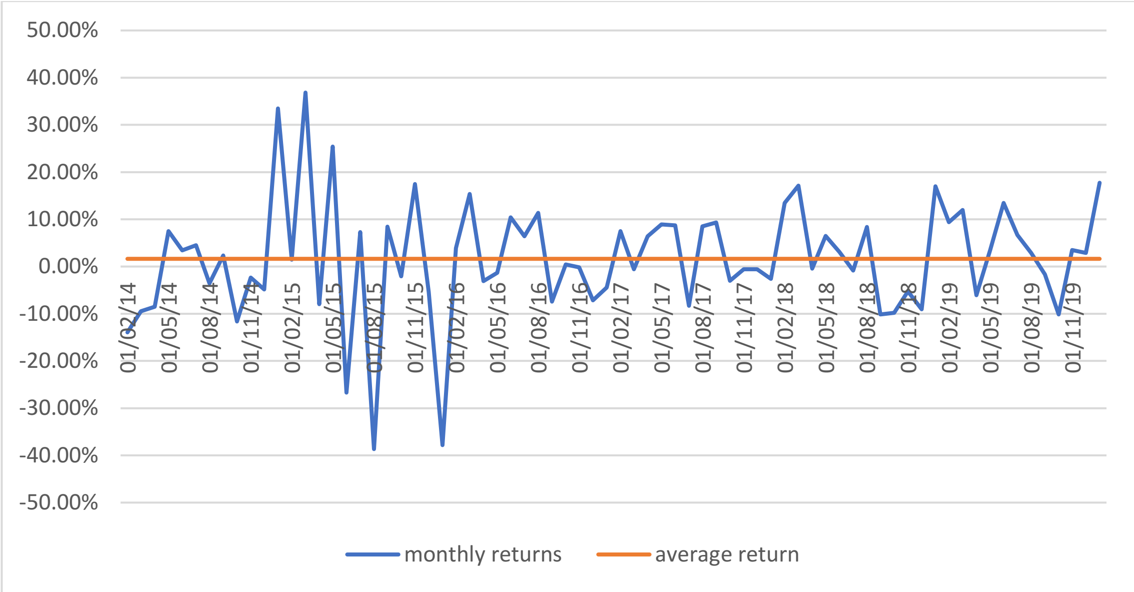
Source: Author

Monthly returns of ZTE (2014-2019)



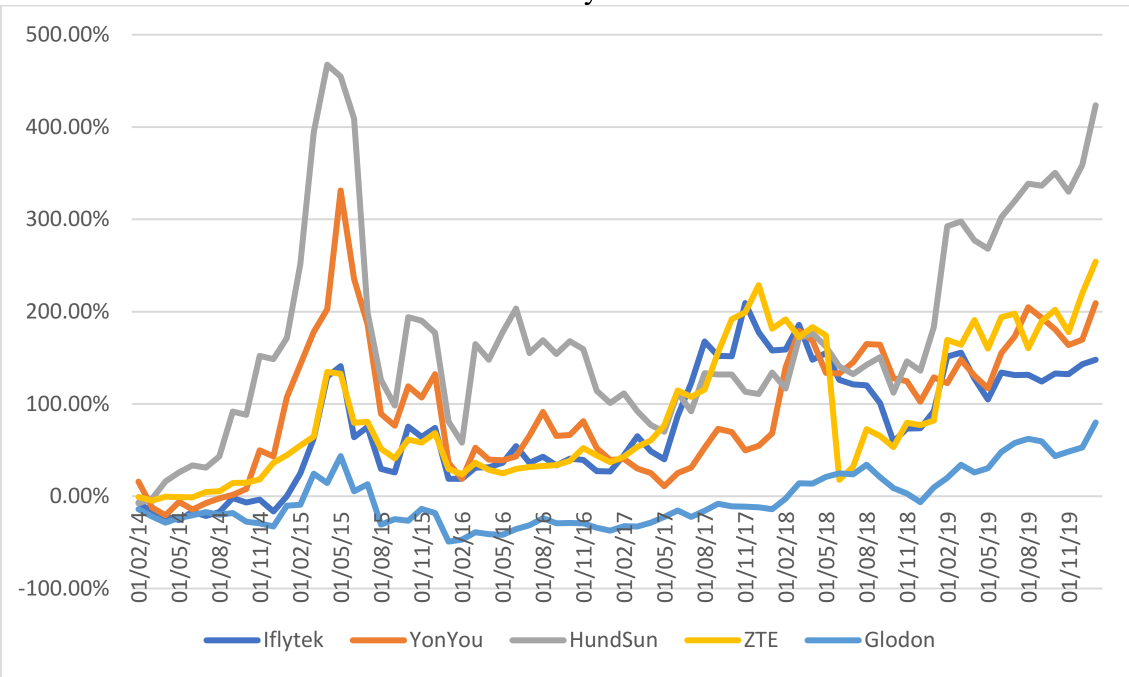
Source: Author

Monthly returns of Glodon (2014-2019)



Source: Author

Annex 3 Cumulative returns based on monthly returns from 2014 to 2019



Source: Author